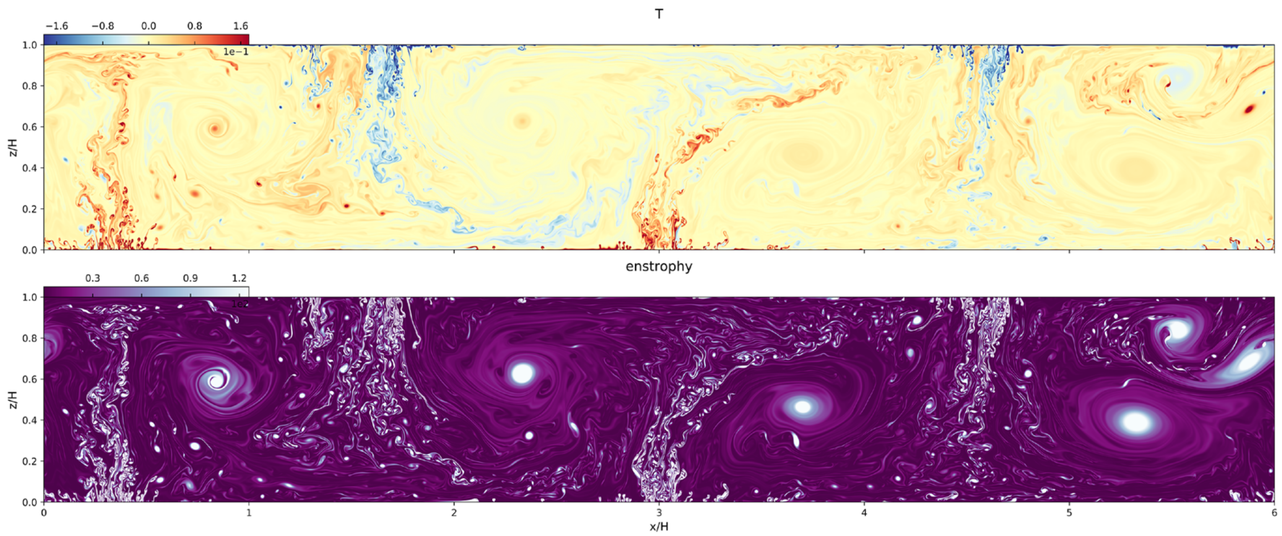
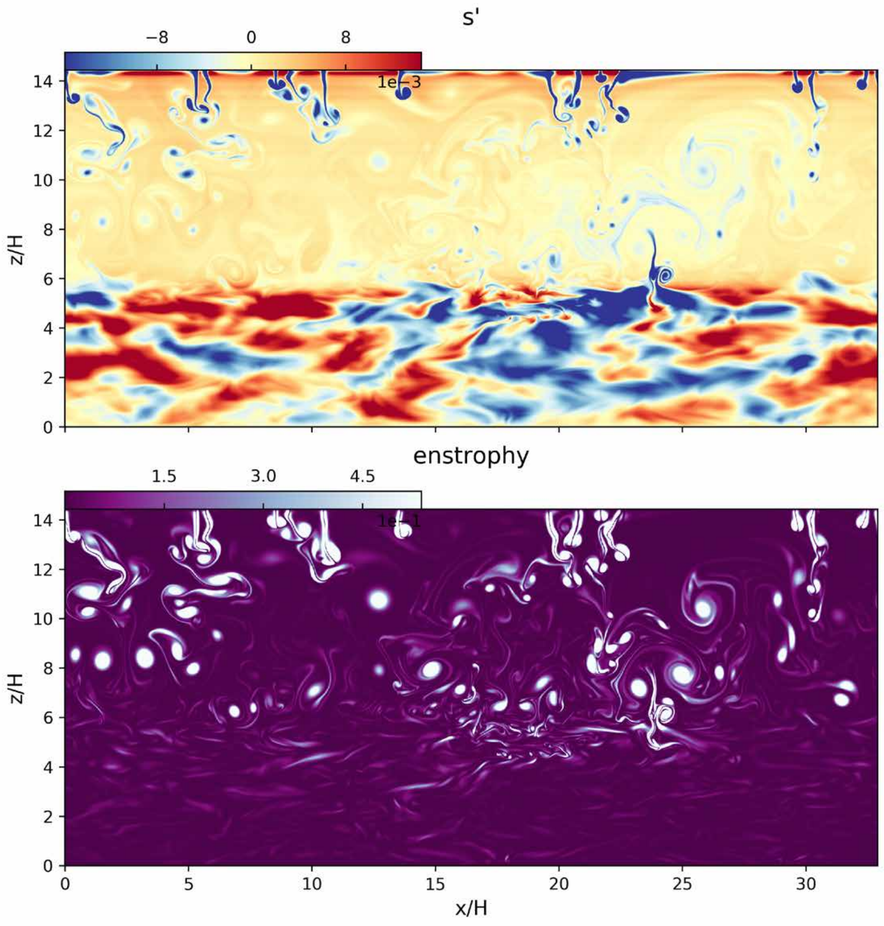


Snapshot from a simulation of very turbulent, unstratified Rayleigh-Bénard convection (Reynolds number ~10^4). Hot plumes rise, and shear (shown by enstrophy) is strong in the upflows and downflows, which are similar to each other in structure. These dynamical systems, studied in simulations and laboratory experiments, help form our intuition about convective flows, but have several important differences from stratified stellar convection. *Benjamin Brown, University of Colorado*



Simulations of turbulent, stratified stellar convection above a stable wave region. Convective motions are dominated by cold falling plumes (blue); the upflows (red) are neither similar in structure to the cold falling plumes, nor similarly strong in amplitude to those plumes. This is in contrast to the symmetry seen for plumes in Rayleigh-Bénard convection, shown in the image at top. Interactions between the convection and the wave region are significant, with breaking waves curling up within the convection zone before falling back. *Benjamin Brown, University of Colorado*

National Aeronautics and Space Administration

Studying Convection in Stars like Our Sun

In stars like our Sun, magnetic fields that we see as sunspots on the surface are generated by convection in the stellar interior. These magnetic fields are the source of solar and stellar magnetic activity, which affects life here on Earth and the habitability of planets around other stars. Using the open-source Dedalus pseudospectral framework, we produce simulations to study dynamical processes at the boundary between the region of convection and the deeper regions of stars to understand how our Sun generates its global-scale magnetic fields by dynamo action. We find evidence that this boundary region may play a surprisingly small role in the operation of the solar dynamo. If true, this suggests that solar and stellar dynamos operate very differently than our current conceptual models.

Benjamin Brown, University of Colorado

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